DOI: 10.1017/S143192760551033X
Microsc Microanal 11(Suppl 2), 2005

THE HITCHHIKER'S GUIDE TO THE INNER (CELLULAR) GALAXIES: CYTOLOGY, CYTOMETRY, CYTOMICS, CELLOMICS AND KINOMICS.

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The Fluorescence, Flow Cytometry and Cytomics symposium welcomes you to this excursion into instrumental methods of deciphering these inner galaxies of biology (with due apology to the late Douglas Adams) [1]. It has usually been our intention to review some of the instrumental improvements in flow cytometry, multiparameter fluorescence detection and correlative aspects of microscopy with confocal and other laser or fluorescence microscopies [2]. We will continue to do this, and we will have excellent instrumental presentations. It is time to improve our perspective of just what we are looking for. There is grandeur in these views of life, even from the microscopical view alone, and these universes only get better as instruments improve.

It is only recently that flow cytometry researchers considered the topic of Cytomics, presently defined as the functional analysis of cell. Along with the flowering universes of Genomics and Proteomics, the very subject of ~Omics has similarly blossomed in technical ways that should not be confusing. I only touch on the subject to open the door of investigation. However, the enormous amounts of information now available suggest that a brief tour of this universe deserves our attention. The National Center for Biotechnology Information (NCBI) of the National Library of Medicine (NLM) has the task to integrate the many databases that are being developed. The complexity of this development is illustrated in Figure 1, below. [Fig.1][3]

Advances in flow cytometry and fluorescence must now include another important character, the kinome. Kinomics not only has come of age in our world, but also provides an avenue at the complexity of the cellular picture, whether you consider that in the context of microscopy, cytometry, cytomics or kinomics. Kinomics, the study of the kinome, focuses on the protein substrates and activities of the protein kinases (PKs) [5]. This area provides a rich field of research that promises to outdo the proteins we have studied so far, the classified CD Antigens.

Early in the history of flow cytometry, it became necessary to develop a systematic means of classification of surface proteins, particularly for the lymphocytes. This soon developed into the HLDA project, the International Workshop and Conference on Human Leucocyte Differentiation Antigens. Differentiation antigens are proteins eventually classified with a CD number (e.g. CD1A antigen from tumor infiltrating dendritic cells.) The reader is referred to the HLDA8 website, as the classified CD Antigens are now listed to CD339, this last one identified as the jagged 1 protein, JAG1. The HLDA project is a very careful effort of proposal, classification, review and analysis and has contributed greatly to the systematic development of protein indentification in cellular systems.[4] The continuing development of multiparameter fluorescence detection could not flourish without this standardization and quality assurance. Combined with advances in the fluorescent probes and fluorescent proteins (e.g. GFP. RFP, YFP, etc.) Comparative and correlative research continues to advance microscopy and cytometry programs, all part of our continuing scholarly conversation. [7]

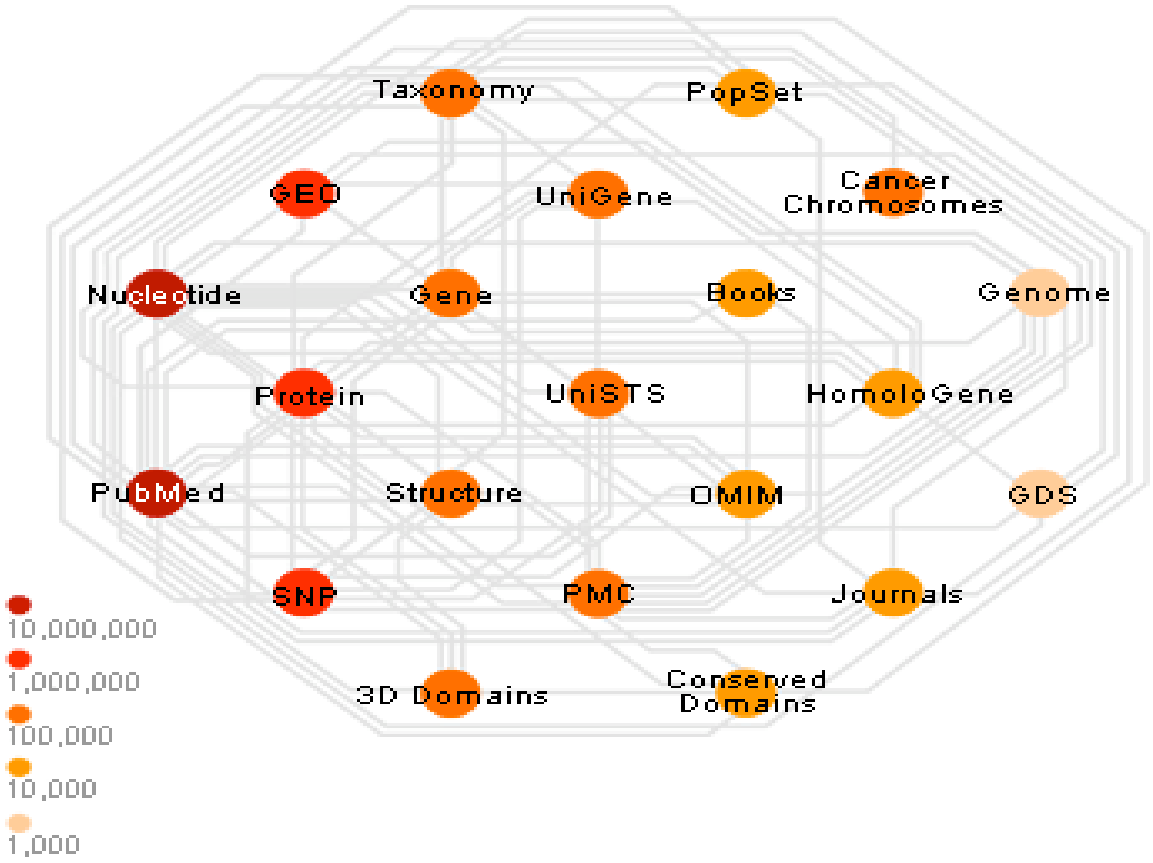

FIGURE 1: Research Database Bioinformatics graphic at the National Library of Medicine. National Center for Biotechnology Information (NCBI). [3] [6]

REFERENCES

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[7] T. D. Grant (Banker), et al. Dev. Dynam. 218(2) (2000) 394.

** David Thurmond Clark, 1925-2004, Professor Emeritus at Portland State University was a friend to microscopists everywhere, and a generous supporter of biological education on many fronts. In acknowledging his passing, I wish to recall the generous personal spirit and humor with which he treated all people. During his years as Dean of Graduate Studies and Research, he fostered many young students from developing countries. In an era where education is having a difficult time, it is important to remember that his support was more than his personal spirit and generosity, which was present in abundance. His support came also with the strength of his convictions that people are good, people are curious about the world around them, and that we can and should assist in the next generations of physicians, biologists, immunologists, parasitologists and microscopists. We remember his many contributions with gratitude. RWSmith

https://doi.org/10.1017/S143192760551033X Published online by Cambridge University Press